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REMARKS/ARGUMENTS

Upon entry of the instant amendment, claims 1-47 are pending in the instant application. Claims 1, 14, 16 and 21 have been amended. Claims 48-52 are new. Applicants respectfully submit that the amendments do not introduce new matter and are made without any intention to abandon the subject matter as filed, but with the intention that claims of the same, greater, or lesser scope may be filed in a continuing application.

Support for the above amendments and new claims is given through the specification, specifically as follows.

Support for the amendment of claim 1,14,16 and 21 can be found in paragraph 9 where it says "Improving these control processes results in improved executive control, attention control and any other control mechanism.." and in paragraph 10 where it says "control processes, including but not limited to, executive control, attention control ..", and in paragraph 17 and paragraph 19.

Support for new claim 48 can be found in paragraphs 9-11, 13, 17, 19, 34, 38, 43, 47, 50, 58 and 65.

Support for new claim 49 can be found in paragraphs 11 and 45.

Support for new claim 50 can be found in paragraphs 50 and 51.

Support for new claim 51 can be found in paragraphs 50, 51, and 34.

Support for new claim 52 can be found in paragraphs 39-47.

EXAMINER INTERVIEW

Applicant thanks Examiners Timothy A Musselman and Kesha Frisby for the meeting with Applicant's agent, D'vorah Graeser, on September 10 2008 in which the

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rejections of the claims in the Office Action of September 27 2008 were discussed, as was the cited art of Silva. Proposed claim amendments and additional claims were discussed, particularly with regard to the importance of cognitive control processes for the present invention. Applicant thanks the Examiners for their time and consideration.

Objections to the claims

None

Rejections Under 35 U.S.C. §102(b)

The Examiner rejected claims 1-33, 36-37 and 40-47 under 35 U.S.C. §102(b) as being anticipated by Silva et al. (US4,741,462). Applicant respectfully traverses the rejections. The above claim supports the important differences between the present claimed invention and that of Silva (US patent No 4,751,642). Silva teaches high fidelity physical simulation as means for training, while the present invention teaches training of control processes that are needed for performing a certain task.

Cognitive control is a term synonymous with executive functions which is used to describe a set of cognitive abilities that control and regulate other abilities and behaviors. Cognitive control processes are necessary for goal-directed behavior. Cognitive control processes include the ability to initiate and stop actions, to monitor and change behavior as needed, and to plan future behavior when faced with novel tasks and situations. Cognitive control processes allow people to anticipate outcomes and adapt to changing situations. The ability to form concepts and think abstractly is often considered components of cognitive control processes. Often, the cognitive control processes are invoked when it is necessary to override responses that may otherwise be automatically elicited by stimuli in the external environment. For example, on being presented with a potentially rewarding stimulus, such as a tasty piece of chocolate cake, the automatic response might be to take a bite. However, where this behavior conflicts with internal plans (such as having decided not to eat chocolate cake whilst on a diet), the cognitive control processes might be engaged to inhibit this response. The neural mechanisms by

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which the cognitive control processes are implemented are a topic of ongoing debate in the field of cognitive neuroscience.

Although the examiner has stated that Silva discloses a sport psychology training cognitive system that comprises presenting a user with a plurality of tasks, Silva does not teach or suggest how to train the control processes that are required for performing a certain task. Silva teaches a system that simulates the physical environment and monitors the trainer physical reactions to the simulated environment for determining the performance of the athlete and his psychological reaction to the simulated environment (see col. 4: 5-25). By contrast Greenspan patent application 2006003298 refers to "... decomposition and analysis of the various task components. These task components represent actions to be performed during the task, which are related to cognitive skills which may be trained by the present invention. Preferably, these task components are related to control processes. Optionally and more preferably, the actions performed during the task are mapped to specific cognitive skills in which the subject may be trained ..." (see paragraph 0039).

The examiner rejects claims 34 and 35 under U.S.C 103(a) as being unpatentable over Silva et al. (US 4,751,642) in view of Aldridge (US 20002/0037759). Applicant respectfully traverses the rejections. The above claim supports the important differences between the present claimed invention and that of Aldridge (US 20002/0037759).

Cognitive control has been well known for years. An example can be found in the article entitled *A system level perspective attention and cognitive control* written by Jonathan D. Cohen, Gary Aston-Jones and Mark S. Gilzenrat" where it states: "Controlled processes are defined as those that rely on attention for execution, while automatic processes are defined as those that can be carried out without attention." This quote can be found on page 74. This article, on page 76, further describes the difference between attention and attention control. "One answer to this question was implicit in the introduction to this chapter, in the choice to focus on "controlled attention," suggesting that attention interactions related to "control" exhibit a cohesive set of properties that distinguish them from other types of attentional interactions."

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Another article, entitled *The skill of attention control: Acquisition and Execution of Attention Strategies*, written by Daniel Gopher, provides a overall discussion of cognitive control processes. In particular page 301 recites "...the most widely researched and documented aspect of voluntary attention control is the ability of humans to adopt a selective attention set and combat interfaces from irrelevant information. Research over the last four decades has shown that subjects can focus, lock on, and prioritize almost any feature". In the same article, on page 318, it says that cognitive control and, in particular, executive and attention control, can be trained. "...nevertheless, through directed experience with different attention strategies, both task performance and attention control improve."

Another article, entitled *Executive Control of Cognitive Processes in Task Switching* by Joshua S. Rubinstein, David E. Meyer and Jeffrey E. Evans, on page 764 describes executive control. "For now, we focus on three representative theories: the attention-to-action (ATA) model (Norman & Shallice, 1986), the frontal-lobe executive (FLE) model (Duncan, 1986), and the strategic response-deferment (SRD) model (Meyer & Kieras, 1997a, 1997b, 1999)."

The above statements clearly demonstrate that cognitive (attention) control processes are very different from the actual act of attention per-se, which is in turn different from training motor aspects of tasks, which in turn clearly differentiates the present invention (as claimed) from Silva, among other differences.

Although the Examiner has stated that a training system being used for a variety of sports is obvious, the method and system for generating of control processes in a training task was not obvious at the time of filing the present application. Many daily activities, and particularly sports-related activities, involve cognitive skills in general, and cognitive control processes in particular, such as executive control, that are responsible for aspects such as planning and sequencing activities, focusing attention, selecting between environmental aspects, switching and dividing attention between different actions, mental rotation, peripheral vision and perception, pattern recognition etc. The level of such skills greatly affects the performance of the athlete or any other individual performing a task. Training can significantly improve the level of cognitive skills, and various training

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programs are used to achieve such an improvement. Such programs include physical and simulated exercises. Studies have shown that complex cognitive skills in general, and psychomotor skills in particular can be trained in laboratory settings and transferred to real-life job or task settings such as aviation (Gopher et al., 1994; Phillips et al., 1993; Ortiz, 1994; Dennis and Harris, 1998). For example, practice effects on the ability of subjects to localize targets in the periphery have been shown (Ball et al., 1988), with effects being maintained over a six-month period.

Other studies have shown that attention control, executive control and other control skills such as switching between tasks, dividing attention and selecting between speed and accuracy emphases can also be trained and transferred (Gopher et al., 2000); Airplane or helicopter pilots may use a flight simulator to practice physical and mental skills associated with flying an aircraft. These simulators allow both physical and cognitive fidelity to the various cognitive and physical actions performed during flying. However, other types of tasks are more difficult to train with a simulator, and/or a typical high physical fidelity simulator is inadequate for the task to be trained. For example, sports such as basketball, which require a large amount of physical movement, including movement of the body of subject across a large court, are difficult if not impossible to train with currently available simulators.

Studies have shown that highly realistic physical simulators, which tend to be very expensive, may not help in improving certain tasks. High similarity in physical simulation, if does not achieve complete identity with target environment may be detrimental in achieving high results in reality (Hawking 1987, Lintern 1987). If high realism reflects extensive complexity it might not lead to focusing on the elements that need to be trained. Another article, *Engineering Psychology and Human Performance Second Edition* by Christopher D. Wickens says , on page 240 " Does this mean that training simulators should resemble the real world as closely as possible? In fact, the answer to this question is no for a number of reasons (Hopkins, 1975; Jones, Hennessy, &Deutsch, 1985, Schneider, 1985). First, highly realistic simulators tend to be very expensive, but their added realism may add little to their TER (Hawkins, 1987). Second, in some cases, high similarity, if it does not achieve complete identity with the target

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environment, may be detrimental by leading to incompatible response tendencies or strategies. For example, there is little evidence that motion in flight simulators, which cannot approach the actual motion of the aircraft, offers any positive transfer benefits (Hawkins, 1987, Lintern, 1987). Finally, if high realism presents overwhelming complexity, it may so increase workload and divert attention from the critical skill to be learned that effective learning is inhibited." On page 241 the same article states "However, the critical design questions may be focused on those aspects of the difference between training and transfer (or between an old and new system) that do involve incompatible responses or inappropriate strategies. For example, consider two word-processing systems accomplish the same editing commands. A high level of skill acquired through extensive training on the first system will show some interference with transfer to the second, even though the overall transfer will be positive. Or consider two control panels that both require a lever movement to accomplish the function. However, the one panel the lever must be pushed up, and in the other it must be pushed down".

The present invention targets the issue raised by this article, by using a cognitive trainer which trains the cognitive process related to the task to be learned, instead of simulating the real physical world. Furthermore, the present invention represents a significant inventive advance over the teachings of this article, by avoiding problems associated with simulators centered around physical fidelity. Instead, the present invention trains the critical cognitive skills required for good performance of a certain task, including executive skills, and creates a training tool which focuses on the cognitive skills. The present invention, as opposed to prior art, can be used not only for training athletes, but also for many type of training. For example, the present invention can be used for improving cognitive skills in elderly people.

US patent 4,751,642 by Silva teaches a simulation system providing means for simulating an actual environment, sensor for measuring sports performance and psychological performance and computer means for responsiveness to performance data and controlling the environment according to data. However it does not describe a method for generating of cognitive control processes in a training task, without requiring

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complete physical fidelity to the physical actions being performed during performance of the actual task.

US Patent Application 2002/0037759 by Aldridge teaches a system for detecting and displaying force data relating to impacts received on an item of athletic equipment includes two or more items of athletic equipment each having a force sensor, logic and a wireless transmitter therein, a receiver adapted to receive signals from each of the transmitters, and a processor for formatting the data for display. The data may be displayed as a standalone graphic or superimposed over an image of a match. However it does not describe a method for generating of cognitive control processes in a training task, without requiring complete physical fidelity to the physical actions being performed during performance of the actual task.

NEW CLAIMS

New claims 48-52 are provided. All new claims are independent claims and more completely capture all aspects of the claimed invention; support is given above. These new claims are felt to be in condition for allowance for the reasons given above.

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CONCLUSION

Applicant believes that the claims are in condition for allowance. If the Examiner believes that a telephonic interview with the undersigned would expedite prosecution of this application, the Examiner is cordially invited to call the undersigned at (301) 952-1011.

Respectfully submitted,



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Attachment